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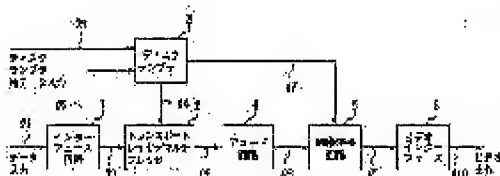
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(54) IMAGE PROCESSING TERMINAL EQUIPMENT, IMAGE DETECTOR AND IMAGE PROCESSOR

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent illicit copy by outputting image data, to which a mark set in advance is added, by applying that mark to the image data of transmission format, to which compressing processing is performed, inputted from the outside.

SOLUTION: An image signal is inputted to an interface circuit 1. The input signal is converted to MPEG2-TS and inputted to a transport layer demultiplexer 2. In this case, the information of MPEG2-TS is converted to the information of MPEG-PS and when the information is descrambled, descrambling is canceled by the information of descrambler 3. The information of MPEG-PS is converted to RGB signals by a decode circuit 4. Based on the information from the descrambler 3, a prescribed mark of each terminal equipment is applied to each of the RGB signals by an image converting circuit 5 and these signals are converted to NTSC signals by a video interface 6 and outputted from a monitor, etc.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to an image processing terminal device, a picture sensing device and an image processing device, an image processing terminal device suitable for preventing illicit copies, such as image data, in more detail, a picture sensing device, and an image processing device.

[0002]

[Description of the Prior Art] In recent years, the system which supplies dynamic image data via a network system, what is called cable TV (CATV), the system which supplies a picture electric wave only to a specific contractor from an artificial satellite, etc. are used.

[0003] If the sending signal was enciphered and the network and the input signal of the satellite radio wave were reproduced as it was in order to prevent damage of the image data supply origin by illegal reception of data, it is preventing from restoring image data as meaningful information in such a system.

[0004] That is, the mechanism which restores to the signal enciphered by the terminal of the receiver as shown in drawing 20 is formed, and only the specific contractor enables it to enjoy the information concerned.

[0005] Drawing 20 is a figure showing the image processing terminal device for the conventional picture reception.

[0006] In the figure, the received image data, i.e., the input data enciphered. It is inputted into the multiplexer layer demultiplexer 92 via the interface circuit 91, and format conversion is carried out in the multiplexer layer demultiplexer 92, and it recovers from the state where it was enciphered by the operation from the descrambler 93.

[0007] The image data to which it restored is further changed into digital image data in the decode circuit 94, and is outputted on displays, such as a monitor which is not illustrated via the video audio interface 95.

[0008]

[Problem(s) to be Solved by the Invention] Thus, according to the conventional image processing terminal device which receives picture information etc. from a network, CATV, external storages, such as artificial health and a server, etc. Since the multiplexer layer demultiplexer 92 and the data enciphered by operation of the descrambler 93 can be restored to it and supplied, a data supply contractor's profits can be protected certainly. The above-mentioned system can respond not only to image data but to the voice data and information supply on all others.

[0009] However, since the image data which gets over and is outputted to a display at this time can be copied free in a previous stage rather than the decode circuit 94 or the video audio interface 95, it cannot prevent being copied unjustly.

[0010] Thus, when image data, voice data, etc. which were copied unjustly are sold, there is no means to specify a copy source and there is a difficulty that an owner's of a copyright protection is missing.

[0011] Conversely, since an owner's of a copyright protection is missing, the owner of a copyright concerned may show unwillingness to supply of these data, and the problem that operation of the above-mentioned system etc. does not go smoothly may be produced.

[0012] This invention was made in consideration of such the actual condition, and the 1st purpose is to provide the image processing terminal device for preventing an illicit copy.

[0013] The 2nd purpose is to provide the image processing device for preventing an illicit copy.

[0014] The 3rd purpose is to provide the picture sensing device which detects this, if an illicit copy should be carried out.

[0015]

[Means for Solving the Problem]In order to solve an aforementioned problem, an invention corresponding to claim 1, A transmission format data conversion means which changes image data of compressed transmission format inputted from the exterior into a data format in which elongation processing is possible, A decode means which performs elongation processing to image data changed into a data format in which elongation processing is possible, Marking of the mark of a kind beforehand set as this elongated image data is carried out, It is an image processing terminal device with which a source of image data is specified by having a marking means which outputs image data to which the mark concerned was added, and a mark in which marking was carried out by marking means being detected, and a kind of the mark being judged.

[0016]In an invention corresponding to claim 1 in an invention corresponding to claim 2, When encryption processing is performed to transmission format image data, it has an encryption release means which inputs information for canceling encryption into a transmission format data conversion means, A transmission format data conversion means as which information for canceling encryption was inputted is an image processing terminal device which also carries out code release when carrying out data conversion to a data format in which elongation processing is possible.

[0017]In an invention corresponding to claim 2 or 1, an invention corresponding to claim 3 is an image processing terminal device which marking of the mark is carried out into an effective display rectangle of a screen where image data is displayed, and can be viewed.

[0018]It is an image processing terminal device which marking of the mark is carried out in an invention corresponding to claim 2 or 1 into an effective display rectangle of a screen where image data is displayed, and cannot view an invention corresponding to claim 4 further again.

[0019]On the other hand, in an invention corresponding to claim 2 or 1, an invention corresponding to claim 5 is an image processing terminal device with which marking of the mark is carried out out of an effective display rectangle of a screen where image data is displayed.

[0020]Next, a marking means to which an invention corresponding to claim 6 carries out marking of the mark of a kind beforehand set as incompressible image data inputted from the exterior, The data compression of the image data on which it was marked by this marking means is carried out, It is an image processing device with which a source of image data is specified by having an encode means which outputs compressed image data, and a mark in which marking was carried out by marking means being detected, and a kind of the mark being judged.

[0021]The 1st input means that inputs image data from which an invention corresponding to claim 7 serves as a standard, The 2nd input means that inputs image data used as a comparison object, and a point-of-difference detection means to detect both point of difference when the contents of image data inputted by the 1st and 2nd input means are almost the same, When there are two or more image processing terminal devices about at least one of image processing terminal devices of claims 1-5, Mark information holding mechanism by which information about a kind of mark set up for every image processing terminal device was held, A portion of image data used as a comparison object in a point of difference detected by a point-of-difference detection means, When judged with it being a mark of a mark judging means which judges whether it is a mark of which kind held at mark information holding mechanism, and which kind, It is the picture sensing device provided with an equipment information output means which outputs equipment information of an image processing terminal device which carries out marking of the kind of mark.

[0022]The 1st input means that inputs image data from which an invention corresponding to claim 8 serves as a standard, The 2nd input means that inputs image data used as a comparison object, and a point-of-difference detection means to detect both point of difference when the contents of image data inputted by the 1st and 2nd input means are almost the same, Mark information holding mechanism by which

information about a kind of mark about image data in which an image processing device of claim 6 carried out marking was held, A mark judging means which judges whether a portion of image data used as a comparison object in a point of difference detected by a point-of-difference detection means is a mark of which kind held at mark information holding mechanism, When judged with it being a mark of which kind, it is the picture sensing device provided with an information output means which outputs information about image data corresponding to the kind of mark.

[0023]Image data from which an invention corresponding to claim 9 serves as a comparison object in an invention corresponding to claim 8 or 7 is a picture sensing device inputted from a communication path or a transmission route of image data further again.

[0024]Therefore, in an image processing terminal device of an invention corresponding to claim 1, first, by a transmission format data conversion means, it is inputted from the exterior and transmission format image data to which compression processing was performed is changed into a data format in which elongation processing is possible.

[0025]Next, elongation processing is performed to image data changed into a data format in which elongation processing is possible by a decode means.

[0026]Thereby, although image data is changed into a displayable data by the monitor of a video signal etc., etc., marking of the mark of a kind beforehand set up by a marking means is carried out to this elongated image data, and image data to which the mark concerned was added is outputted.

[0027]If a predetermined thing is defined by every image processing terminal device and a kind of mark here differs in each image processing terminal device by it, they shall differ fundamentally.

[0028]Thus, it may be connected to a videocassette recorder etc. depending on the case, and image data by which extension conversion was carried out and whose display was attained may be recorded further.

[0029]However, image data outputted by this image processing terminal device is received, Since it can be specified by detecting a mark and judging a kind of the mark whether it is the image data outputted by which terminal unit, even when an illicit copy is carried out, for example, an image processing terminal device with which the copy was made can be specified.

[0030]Therefore, this image processing terminal device will produce [as opposed to / especially / prevention from an illicit copy] effect, if image data is used for a terminal at the time of carrying out contract supply, etc. in a commercial base, for example.

[0031]In an image processing terminal device of an invention corresponding to claim 2, when it acts like an invention corresponding to claim 1 and also encryption processing is performed to transmission format image data, information for canceling encryption is inputted into a transmission format data conversion means by an encryption release means. A descrambler etc. are used for this encryption release means, for example.

[0032]and -- facing by a transmission format data conversion means as which information for canceling encryption was inputted, although data conversion is carried out to a data format in which elongation processing is possible -- code release -- although -- it carries out.

[0033]In an image processing terminal device of an invention corresponding to claim 3, it acts like an invention corresponding to claim 2 or 1, and also a mark is taken as what can be viewed into an effective display rectangle of a screen where image data is displayed.

[0034]For example, it is effective in the ability to warn by putting in a logo of data supply origin and enabling viewing of a mark of prohibition of an illicit copy act clearly.

[0035]In an image processing terminal device of an invention corresponding to claim 4, it acts like an invention corresponding to claim 2 or 1, and also a mark is taken as what cannot be viewed further again into an effective display rectangle of a screen where image data is displayed.

[0036]It is made not to understand it as changing specific 1 bit into a predetermined color etc., although

this puts in a mark only by glancing with human being's naked eye.

[0037]Therefore, an unnecessary display can be prevented from entering to a screen display although it has an effect of prohibition of the above-mentioned illicit copy.

[0038]On the other hand, in an image processing terminal device of an invention corresponding to claim 5, it acts like an invention corresponding to claim 2 or 1, and also marking of the mark is carried out out of an effective display rectangle of a screen where image data is displayed. Therefore, an effect of the invention corresponding to claim 4 can be done so much more certainly.

[0039]Next, in an image processing terminal device of an invention corresponding to claim 6, marking of the mark of a kind beforehand set as incompressible image data inputted from the exterior by a marking means is carried out.

[0040]The data compression of the image data on which it was marked by marking means is carried out by encode means, and compressed image data is outputted.

[0041]Whenever it processes a kind of mark here, for example with this image processing device, it can consider changing therefore.

[0042]Therefore, when an illicit copy is discovered, it can be specified for which image data supplier company it provides, because the owner of a copyright itself uses this device and provides an image data supplier company etc. with image data containing a mark, for example.

[0043]In an image processing terminal device of an invention corresponding to claim 7, image data which serves as a standard by the 1st input means is inputted first.

[0044]Next, image data used as a comparison object is inputted by the 2nd input means.

[0045]By a point-of-difference detection means, when the contents of image data inputted by the 1st and 2nd input means are almost the same, both point of difference is detected.

[0046]Here, it means almost same being the same movie, an animation of the same scene, and a picture, for example. That is, even if it compares image data from which the contents differ from the first, it is because it is meaningless about illicit copy detection. That is, if it sees by human being's eyes, a point that the almost same image data is minutely different will be detected.

[0047]On the other hand, when mark information holding mechanism has two or more image processing terminal devices about at least one of image processing devices of an image processing terminal device of claims 1-5, information about a kind of mark set up for every image processing terminal device is held.

[0048]And a portion of image data which serves as a comparison object in a point of difference detected by a point-of-difference detection means by an equipment information output means, When judged with it being a mark of a mark judging means which judges whether it is a mark of which kind held at mark information holding mechanism, and which kind, equipment information of an image processing terminal device which carries out marking of the kind of mark is outputted.

[0049]Thereby, an image processing terminal device with which an illicit copy etc. were carried out can be specified.

[0050]In an image processing terminal device of an invention corresponding to claim 8, Information about a kind of mark about image data in which an image processing device of claim 6 carried out marking to mark information holding mechanism is held, and by an information output means. Information about image data corresponding to a mark of a judged kind is outputted, and also it acts like an image processing device corresponding to claim 7.

[0051]Therefore, when an illicit copy is discovered, for example, it can be specified for which image data supplier company it provides.

[0052]In an image processing terminal device of an invention corresponding to claim 9, it acts like an invention corresponding to claim 8 or 7, and also image data used as a comparison object is inputted from a communication path or a transmission route of image data.

[0053]

[Embodiment of the Invention] Hereafter, an embodiment of the invention is described.

[0054] (A 1st embodiment of an invention) Drawing 1 is a lineblock diagram showing an example of the image processing terminal device concerning a 1st embodiment of this invention.

[0055] This image processing terminal device The interface circuit 1 and the transport layer demultiplexer 2, It is constituted by the descrambler 3, the decode circuit 4, the image conversion circuit 5, the video interface 6, and the monitor of the display etc. which are not illustrated and other circumference elements.

[0056] The interface circuit 1 changes into TS format (transport stream format of MPEG 2) the picture signal inputted from the signal wire 11, and outputs it to the transport layer demultiplexer 2. When the information about a disk rumble is inputted with the signal wire 11, for example the information about a disk rumble is included in the picture signal etc., the information about this disk rumble is outputted to the descrambler 3 via the signal wire 12.

[0057] Here, it connects with the circuit and apparatus which is not illustrated, such as a receiving set to the transmission from communication lines, such as CATV which is not illustrated, memory storage, and an artificial satellite, TV broadcast, etc., and the signal wire 11 inputs information and connects it to the interface circuit 1.

[0058] The transport layer demultiplexer 2 changes into PS format, i.e., MPEG 2-PS, the information (MPEG 2-TS) inputted from the interface circuit 1 via the signal wire 13. When the disk rumble of the information inputted via the signal wire 13 is carried out and it cannot use it as image data as it is, a disk rumble is canceled based on the information inputted via the signal wire 14.

[0059] A disk rumble is a preventing [give a kind of encryption to a sending signal, and]-from playing picture signal correctly-thing without authority thing.

[0060] The descrambler 3 generates the release information of a disk rumble based on the information inputted from the signal wires 12 and 15, and outputs it to the transport layer demultiplexer 2 via the signal wire 14.

[0061] The descrambler 3 generates the information for image transformation used in the image conversion circuit 5. The information for these image transformation is created using the signal wire 12 and the information inputted from 15.

[0062] Here, the signal wire 15 inputs signals (time, ID called the identification information of apparatus, etc.) required for disk rumble release or a set into the descrambler 3.

[0063] The decode circuit 4 decodes the information on MPEG 2-PS that it was inputted from the transport layer demultiplexer 2 via the signal wire 16, and generates video signals, such as RGB and YUV.

[0064] The image conversion circuit 5 changes the video signal which the information for image transformation generated with the descrambler 3 is inputted via the signal wire 17, and is inputted from the decode circuit 4 via the signal wire 18 based on this information. Thereby, a kind of marking is made in a video signal.

[0065] Here, the image conversion circuit 5 is explained in more detail using drawing 2.

[0066] Drawing 2 is a block diagram showing the composition of the image conversion circuit in the image processing terminal device of this embodiment.

[0067] This image conversion circuit 5 is constituted by the synchronous control circuit 11, the video signal generating circuit 12, the conversion control circuit 13, the delay circuit 14, and the mixer 15.

[0068] The synchronous control circuit 11 generates the control signal for taking the synchronization of each circuit based on a clock, and inputs it into the video signal generating circuit 12, the conversion control circuit 13, the delay circuit 14, and the mixer 15.

[0069] The video signal generating circuit 12 generates a video signal based on the input signal from the decode circuit 4. In this case, RGB, level, and a Vertical Synchronizing signal are generated.

[0070]The conversion control circuit 13 generates the data for conversion to the signal which calculated based on the information for image transformation that it inputted from the descrambler 3, and determined the conversion part as it, and the video signal generating circuit 12 generated. For this reason, the data from the video signal generating circuit 12 is incorporated, and the information about conversion is outputted to the synchronous control circuit 11.

[0071]The delay circuit 14 delays the screen generated in the video signal generating circuit 12 by one frame.

[0072]The mixer 15 mixes the signal for conversion which the conversion control circuit 13 generated, and the signal which the delay circuit 14 outputted, and generates the video signal containing a mark.

[0073]As shown in drawing 1, the video signal containing this mark is inputted into the video interface 6 via the signal wire 19.

[0074]The changed video signal which is inputted from the image conversion circuit 5 via the signal wire 19 is further changed into other video signals, such as NTSC and PAL, and the video interface 6 outputs it to TV monitor or a videocassette recorder via the signal wire 110. Therefore, when connecting an RGB monitor, for example, the video interface 6 may be omitted and the signal wire 19 may be directly connected to an RGB monitor.

[0075]The correspondence relation of the composition and each above-mentioned composition in a claim is explained below.

[0076]The transmission format data conversion means is constituted by the interface circuit 1 and the transport layer demultiplexer 2, for example.

[0077]The decode means is constituted by the decode circuit, for example.

[0078]The marking means is constituted by the generation portion and the image conversion circuit 5 of data for image transformation of the descrambler 3, for example.

[0079]The code elimination means is constituted by the descrambler 3, for example.

[0080]Next, operation of the image processing terminal device concerning the embodiment of the invention constituted as mentioned above is explained.

[0081]In this image processing terminal device, as shown in drawing 1, first, CATV and the picture signal from TV broadcast are inputted into the interface circuit 1, and an input signal is changed into MPEG 2-TS and inputted into the transport layer demultiplexer 2.

[0082]In the transport layer demultiplexer 2, if the information on MPEG 2-TS is changed into the information on MPEG 2-PS and the disk rumble of the information concerned is carried out, a disk rumble will be canceled by the information from the descrambler 3.

[0083]The information on this MPEG 2-PS is further changed into a RGB code in the decode circuit 4, and is inputted into the image conversion circuit 5.

[0084]In the image conversion circuit 5, marking of the predetermined mark for every terminal unit is carried out in the conversion above-mentioned RGB code based on the information from the descrambler 3, and it is changed into an NTSC signal with the video interface 6, and is outputted from a monitor etc.

[0085]Here, the image processing terminal device of this embodiment has the feature in the place where the conversion as mark addition is made in the image conversion circuit 5 in the video signal of RGB outputted from the decoder circuit 4 based on the data for the image transformation from the descrambler 3.

[0086]However, it is possible to various patterns to perform image transformation, and the image conversion circuit 5 explains the example of operation, i.e., the example of image transformation, to them in drawing 3 - 5 hereafter as an example (1) of operation, an example (2) of operation, and an example (3) of operation.

[0087]An example (1) of operation: Explain an example (1) of operation first using drawing 3.

[0088]Drawing 3 is a figure explaining the example (1) of the image processing terminal device of this embodiment of operation.

[0089]In this case, frame number l which shows what the number of the screens which constitute an animation is from the descrambler 3, line number n in the l frame, and a several meters pixel and the data about RGB are inputted into the image conversion circuit 5 as information for image transformation.

[0090]Therefore, change is added using this lmn information to the data of eye a horizontal m pixel of eye a vertical n line of the l frame. Specifically, the RGB data of the lmn pixel for conversion are changed. By investigating this pixel behind, it is discriminable whether the image data concerned is reproduced by this image processing terminal device.

[0091]Of operation example (2):, next an example (2) of operation are explained using drawing 4.

[0092]Drawing 4 is a figure explaining the example (2) of the image processing terminal device of this embodiment of operation.

[0093]In this case, the conversion control circuit 13 receives the information which contains an identification number as information for image transformation from the descrambler 3, and puts identification information into the retrace line section from which it separated from the usual picture area based on the identification number. Since it has separated from the retrace line section from the monitor display, human being does not notice it at this, seeing a screen.

[0094]Of operation example (3):, next an example (3) of operation are explained using drawing 5.

[0095]Drawing 5 is a figure explaining the example (3) of the image processing terminal device of this embodiment of operation.

[0096]In this case, the conversion control circuit 13 puts in the mark (for example, inside of drawing 5 "T company") which human being looks at in the fixed position of a screen, and it understands clearly based on the information for the image transformation from the descrambler 3. Thereby, whether it is reproduced by the image processing terminal device concerned can identify the picture at a glance.

[0097]Although the above-mentioned example (1) of operation, the example (2) of operation, and the example (3) of operation were explained as an example of image transformation, There are cases, such as carrying out marking to the change of a scene which carries out marking only to the start of image data (video) and the end and which carries out marking for every fixed time as the timing of the image transformation in each of these examples of operation, i.e., timing which performs marking.

[0098]Next, operation of the image conversion circuit 5 in which each operation of the above-mentioned example (1) of operation, an example (2) of operation, and an example (3) of operation is possible is explained using drawing 6.

[0099]Drawing 6 is a flow chart showing operation of the image conversion circuit in the image processing terminal device of this embodiment.

[0100]First, it is judged whether conversion information, i.e., the information for image transformation, is inputted into the conversion control circuit 13 (ST1).

[0101]When not inputted, as what (ST1) and image transformation do not have, the image conversion circuit 5 does not perform image transformation, but is completed.

[0102]When inputted, the conversion information concerned is analyzed in (ST1) and the conversion control circuit 13 (ST2).

[0103]If it is a case of an example (1) of operation as a result of analyzing (ST3), picture information will be first inputted into the conversion control circuit 13 from the video signal generating circuit 12 (ST4).

[0104]Next, picture ornamentation is performed by the conversion control circuit 13 based on the information on the video signal generating circuit 12, and it is outputted to the mixer 15 (ST5). And after that, it is outputted as image data [finishing / marking], and ends.

[0105]Next, if it is a case of an example (2) of operation as a result of analyzing (ST6), first, the control

signal of the retrace line section etc. will be generated by the conversion control circuit 13, and it will be inputted into the synchronous control circuit 11 (ST7).

[0106]And control information is outputted to the mixer 15 by the synchronous control circuit 13, and the mixer 15 outputs an image control signal (ST8). Thereby, marking will be made at the retrace line section and it ends.

[0107]If it is a case of an example (3) of operation as a result of analyzing (ST9), first, the picture information used as a mark will be generated by the conversion control circuit 13, and it will be outputted to the mixer 15 (ST10).

[0108]And by the mixer 15, it is piled up, and the picture information of the video signal control circuit 12 and the conversion control circuit 15 is outputted (ST11), and is completed.

[0109]When it is not any of an example (1) of operation, (2), and (3), either, as (ST9) and analysis being impossible, the image conversion circuit 5 does not perform image transformation, but is completed.

[0110]Thus, marking is made by the video signal in a certain form, and it will be outputted to a monitoring device, a videocassette recorder, etc. by the information from the descrambler 3. Let the kind of this mark be a predetermined thing for every terminal unit.

[0111]Therefore, when illegal copying is made, this marking is detected and it is easily judged by investigating that kind whether it was copied by which image processing terminal device.

[0112]As mentioned above, the image processing terminal device concerning an embodiment of the invention, Since marking of the predetermined mark is carried out and it was made to output it by the image conversion circuit 5 after having changed compression input data, elongating by the interface circuit 1 and the transport layer demultiplexer 2 and making it a video signal, When this output image data is recorded, the source of with which terminal unit to have been recorded can be distinguished.

[0113]Thus, the image data outputted by this image processing terminal device is received, Since it can be specified by detecting a mark and judging the kind of the mark whether it is the image data outputted by which terminal unit, even when an illicit copy is carried out, for example, the image processing terminal device with which the copy was made can be specified.

[0114]Therefore, it is [as opposed to / especially / the prevention from an illicit copy] effective if this image processing terminal device is used for the terminal at the time of carrying out contract supply of the image data in a commercial base, for example, etc.

[0115]Since the image processing terminal device concerning an embodiment of the invention enabled it to reproduce the image data which formed the descrambler 3 and was enciphered, it can much more ensure management of image data conjointly with the above-mentioned effect.

[0116](A 2nd embodiment of an invention) Drawing 7 is a lineblock diagram showing an example of the picture sensing device concerning a 2nd embodiment of this invention, identical codes are given to drawing 1 and identical parts, explanation is omitted, and only a portion different here is described.

[0117]This picture sensing device is for detecting the image data by which marking was carried out with the image processing terminal device explained by a 1st embodiment.

[0118]As shown in drawing 7, a picture sensing device inputs original data, such as video used as a subject of search, and is constituted by the original-data treating part 20 which generates a reference signal, and the comparison circuit 21 which inputs the comparison object signal about video etc. and the above-mentioned reference signal to inspect, and detects an illicit copy.

[0119]The original-data treating part 20 is constituted like the image processing terminal device of a 1st embodiment, and reference signal os1 is inputted into the comparison circuit 21 by the signal wire 111 from the decode circuit 4. Reference signal os2 and os3 are similarly inputted into the comparison circuit 21 by the signal wire 112 and 113 from the image conversion circuit 5 and the video interface 6, respectively.

[0120]The comparison object signals cs1 and cs3 besides the above-mentioned reference signal are inputted into the comparison circuit 21.

[0121]Comparison object signal cs1 is image data which consists of digital signals, for example, it is data in the case of dealing with it by the computer as video of RGB, etc.

[0122]On the other hand, comparison object signal cs3 is image data which consists of analog signals, for example, they are data at the time of once being saved on a tape with a videocassette recorder etc.

[0123]By comparing a reference signal with a comparison object signal, the comparison circuit 21 judges whether the image data corresponding to the comparison object signal concerned is copied illegally in which image processing terminal device, and shows drawing 8 the composition.

[0124]Drawing 8 is a block diagram showing the composition of the comparison circuit in this embodiment.

[0125]As shown in the figure, the comparison circuit 21 is constituted by the 1st comparator 22, the 2nd comparator 23, the 3rd comparator 24, the point-of-difference analyzer 25, and the device-identification-information generation part 26.

[0126]The 1st comparator 22 compares reference signal os1 with comparison object signal cs1, and outputs the point of difference to the point-of-difference analyzer 25.

[0127]The 2nd comparator 23 compares reference signal os2 with comparison object signal cs1, and outputs the point of difference to the point-of-difference analyzer 25.

[0128]The 3rd comparator 24 compares reference signal os3 with comparison object signal cs3, and outputs the point of difference to the point-of-difference analyzer 25.

[0129]The point-of-difference analyzer 25 analyzes the feature of a point of difference with the output from each comparators 22, 23, and 24, and inputs the analysis result into the device-identification-information generation part 26.

[0130]The device-identification-information generation part 26 is provided with the information about what kind of marking is made with each image processing terminal device, When it is able to judge with the image data which serves as a comparison object by this information and the above-mentioned analysis result being the copy of which image processing terminal device, the device identification information (ID information) of that image processing terminal device is outputted.

[0131]The correspondence relation of the composition and the above-mentioned composition in a claim is explained below.

[0132]The 1st input means is constituted by the signal wire l11, l12, and l13, for example.

[0133]The 2nd input means is constituted by the signal wire which inputs comparison object signal cs1 and cs3, for example.

[0134]The point-of-difference detector circuit is constituted by the 1st, 2nd, and 3rd comparator 22, 23, and 24 and the point-of-difference analyzer 25, for example.

[0135]Mark information holding mechanism, the mark judging means, and the equipment information output means are constituted by the device-identification-information generation part 26, for example.

[0136]Next, operation of the picture sensing device concerning the embodiment of the invention constituted as mentioned above is explained.

[0137]In this picture sensing device, original image data is inputted into the original-data treating part 20, and image processing same in an image processing terminal device is performed.

[0138]Therefore, picture detection is performed by setting to reference signal os1, os2, and os3 decode circuit 4 output which is a stage of each image processing, image conversion circuit 5 output, and video interface 6 output.

[0139]Here, reference signal os1 is detectable about whether the picture which must be an identical image has a point of difference.

[0140]When there is a point of difference to the picture by which original image transformation is not made, a possibility of having copied illegally the output from a described image processing terminal device as a reason which the point of difference produced can be considered.

[0141]Then, in such a case, the output of an image processing terminal device will be imitated in the original-data treating part 20, and an image processing terminal device can be specified as it by comparison with reference signal os2 as the picture change output. Although not illustrated especially in drawing 7, the comparative-analysis result in the comparison circuit 21 is reflected in the original-data treating part 20 in order to make the further comparative analysis.

[0142]Thus, the example in the case of the ability to specify an image processing terminal device by the check by reference signal os2 is shown in drawing 9.

[0143]Drawing 9 is a figure showing the situation of comparison in the comparison circuit in this embodiment.

[0144]That is, when the processing in lmn given with a certain image processing terminal device is detected in a comparison object signal in the case of the example (1) of a 1st embodiment of operation as shown in the figure for example, the image data of the comparison detection signal concerned can specify being outputted from the image processing terminal device.

[0145]Thus, in the comparison circuit 21, when there is illegal copying, this can be detected.

[0146]Although the above is a case where reference signal os1 which uses a digital signal, and os2 are used, By operation of the descrambler 3, even when using an analog signal, since the signal with which image transformation was performed, and the signal which is not given can be made free, it can be accepted reference signal os3, and can come out, and same analysis can be conducted.

[0147]Next, the flow of the whole operation of the comparison circuit 21 in this picture sensing device is briefly explained using drawing 10.

[0148]Drawing 10 is a flow chart showing operation of the comparison circuit of this embodiment.

[0149]First, the picture information for comparison testing (an analog, digital) is inputted into the comparison circuit 21. On the other hand, reference signal os1, os2, and os3 are inputted from the original-data treating part 20 (ST11).

[0150]Next, reference signal os1, os2, and os3 are compared with picture information (analog, digital) cs1 for comparison testing and cs3 (ST12).

[0151]It will end, if there is no point of difference about a comparison result, and if there is a point of difference (ST13), a point of difference will be analyzed (ST14).

[0152]And from point-of-difference information, the specific number of a device, i.e., the ID information of an image processing terminal device, is specified (ST15), and the specific number of the device is outputted (16).

[0153]As mentioned above, the picture sensing device concerning an embodiment of the invention, In spite of comparing a reference signal with a comparison object signal and being the same video signal, when it is detected that there is a point of difference, Since it judged whether the point of difference was the copy of the output signal from which image processing terminal device, and it was made to output the equipment information about the terminal unit when it was said copy, The image data which the illicit copy etc. made the output of the image processing terminal device concerning this invention can be detected, and the image processing terminal device of the copy source can be specified.

[0154](A 3rd embodiment of an invention) Drawing 11 is a lineblock diagram showing an example of the picture sensing device concerning a 3rd embodiment of this invention, identical codes are given to drawing 7 and identical parts, explanation is omitted, and only a portion different here is described.

[0155]This picture sensing device is for detecting the image data by which marking was carried out with the image processing terminal device explained by a 1st embodiment.

[0156]The original-data treating part 20 which a picture sensing device inputs original data, such as video used as a subject of search, and generates a reference signal as shown in drawing 7. It is constituted by the comparison circuit 21 which inputs the comparison object signal about video etc. and the above-mentioned reference signal to inspect, and detects an illicit copy, and the image data processing part 27 which generates the comparison object signal inputted into the comparison circuit 21.

[0157]The original-data treating part 20 and the comparison circuit 21 are constituted like the case of the picture sensing device of a 2nd embodiment.

[0158]Each composition in the image data processing part 27 is constituted like each part of the image processing terminal device shown in drawing 1. Comparison object signal cs3 is taken out from the decode circuit 4 from comparison object signal cs1, comparison object signal cs2 from the image conversion circuit 5, and the video interface 6, and it is inputted into the comparison circuit 21.

[0159]In the comparison circuit 21, comparison object signal cs1, cs2, and cs3 are inputted into the 1st, 2nd, and 3rd comparator 22, 23, and 24, respectively.

[0160]Next, operation of the picture sensing device concerning the embodiment of the invention constituted as mentioned above is explained.

[0161]In this picture sensing device, the operation after comparison object signal cs1, cs2, and cs3 were inputted into the comparator 21 is the same as that of the case of a 2nd embodiment of the above.

[0162]Since the image data processing part 27 constituted like a 1st embodiment is used in this picture sensing device, The picture detection same about the image data transmitted via not only the data saved to data storage media, such as videotape and a hard disk, but a network or a communication line as the case of a 2nd embodiment is carried out.

[0163]As mentioned above, the picture sensing device concerning an embodiment of the invention, being constituted like the device of a 2nd embodiment -, since it operated and also enabled it to input the signal used as a comparison object from a network, a communication line, etc., The existence of an exchange of the image data copied to the injustice in a network besides the same effect as the device of a 2nd embodiment etc. can be supervised, and detection of illicit copy data can be ensured further.

[0164](A 4th embodiment of an invention) Drawing 12 is a mimetic diagram showing the example of 1 composition of the data transmission system which applied the picture sensing device concerning a 4th embodiment of this invention.

[0165]As for two or more transmitting origin 31 and 32, in this data transmission system, .. is connected to the transmission control circuit 34 via the transmission line 33 (a communication line may be sufficient), The transmission control circuit 36 was connected via the supervisory circuit 35 from the transmission control circuit 34 on the transmission line 33, and it has resulted [from the transmission control circuit 36] in the receivers 37 and 38 and ..

[0166]Here, the transmission control circuits 34 and 36 have a function which records what kind of data was transmitted. The network server etc. with which the workstation was used for the transmission control circuits 34 and 36, for example correspond.

[0167]The database 39 is connected to the supervisory circuit 35, and the picture sensing device of this embodiment is constituted with the supervisory circuit 35 and the database 39.

[0168]Drawing 13 is a block diagram showing the example of composition of the picture sensing device of this embodiment.

[0169]This supervisory circuit 35 is constituted by the input circuit 40, the data extraction discrimination decision circuit 41, the database control circuit 42, the delayed storage circuit 43, the buffer memory 44, the comparison circuit 45, and the control circuit 46.

[0170]The input circuit 40 is an interface circuit for inputting data from the transmission line 33.

[0171]The data extraction discrimination decision circuit 41 analyzes the information inputted from the

input circuit, and identifies whether it is image data. If it is image data, it identifies in what kind of picture, and an identification code is sent out to the database control circuit 46. The image data is simultaneously sent out to the delayed storage circuit 43.

[0172]Based on the picture identification code inputted from the data extraction discrimination decision circuit 41, the database control circuit 42 accesses the database 39, and takes out a reference image.

[0173]The delayed storage circuit 43 holds temporarily the image data inputted from the data drawing discrimination decision circuit 41. This holding processing is performed in order to take the data and the synchronization which were taken out from the database 39.

[0174]The buffer memory 44 is a memory for buffers which the delayed storage circuit 43 uses.

[0175]As compared with the information inputted from the database 39, and the information inputted from the delayed storage circuit 43, the comparison circuit 45 judges the existence of an illicit copy, and if an illicit copy occurs, it specifies the image processing terminal device. The composition contents of this comparison circuit 45 have the same composition as the comparison circuit 21 shown in the 2nd and 3rd example.

[0176]The control circuit 46 performs synchronous control of each circuit of supervisory circuit 35 inside, and it accesses the transmission control circuit 36 when an illicit copy occurs, and 36 grades, and a transmitting agency performs specification of a transmission destination.

[0177]Next, operation of the picture sensing device concerning the embodiment of the invention constituted as mentioned above is explained.

[0178]First, operation by the whole picture sensing device is explained using the flow chart of drawing 14.

[0179]Drawing 14 is a flow chart showing operation of the picture sensing device of this embodiment.

[0180]First, information is inputted via the input circuit 40 from the transmission line 33 (ST21).

[0181]Next, it ends, if it is judged whether the inputted information is the image data used as discernment and a comparison object and it does not serve as discernment and a comparison object, and if it becomes discernment and a comparison object, it will progress to following step ST23 (ST22).

[0182]In step ST23, the image data which serves as a discrimination object from the data inputted from the transmission line 33 is taken out.

[0183]it is alike in if the taken-out image data is sent out to the delayed storage circuit 43 and saved at the buffer memory 44, and reference video is taken out from the database 39 (ST24).

[0184]The data saved at the buffer memory 44 is compared with the data picked out from the database 39 in the comparison circuit 45 (ST25). If the illicit copy of the data inputted from the transmission line 33 was not carried out, it will end as it is and an illicit copy will be carried out, it is specified whether the illicit copy data concerned is copied by which image processing terminal device (ST27).

[0185]And identification information, such as device ID etc. of the specified image processing terminal device, is outputted (ST28), and it ends.

[0186]When judged with the data currently transmitted on the transmission line 33 being illicit copy data by the above-mentioned operation, transmitting [the illicit copy data] origin is further specified by operation of the control circuit 46. This operation is shown in drawing 15.

[0187]Drawing 15 is a flow chart showing operation of the picture sensing device of this embodiment.

[0188]First, investigation of the data currently transmitted on the transmission line 33 by the operation shown in drawing 14 is conducted (ST31).

[0189]Next, it is judged from these results of an investigation whether the transmission-line 33 top data is copy information (ST32), if it is not an illicit copy, it will end, and if it is an illicit copy, the identification information which specifies transmission destination and dispatch origin (transmitting agency) will be taken out (ST33).

[0190]That is, the data format transmitted on the transmission line 33 is shown in drawing 16 (a) and (b).

[0191] Drawing 16 is a figure showing the example of a data format transmitted on the transmission line 33 in this embodiment.

[0192] As shown in the figure (a), when the transmission destination address and the originator address are included in data, a transmitting agency can be specified immediately (drawing 15, ST37).

[0193] Since a transmitting agency cannot be directly specified on the other hand when the transmission destination address and the address of the transmission control circuits 34 and 36 are included in data, as shown in the figure (b), operation of Steps ST34-ST36 in the flow chart of drawing 15 is needed.

[0194] An inquiry should do to the transmission control circuits 34 and 36 first pinpointed in step ST34 from the transmission source information taken out by step ST33 to be shown in drawing 15. The information as which the data concerned specifies the transmitting origin which transmitted to the transmission control circuit is taken out from the transmission record saved in the transmission control circuit.

[0195] It is asked whether that transmitting origin (in this case, transmission control circuit) is transmit-end origin of the data concerned (ST35).

[0196] If it is transmit-end origin (ST36), transmitting [the data concerned] origin will be become final and conclusive, and it will progress to step ST37. If it is not transmit-end origin, by returning to step ST34 and asking the transmitting origin, a transmitting agency will be gone back one by one, an inquiry and a check will be performed, and final transmitting origin will be become final and conclusive.

[0197] Thus, after final transmitting origin is specified (ST37), the information about a transmitting agency is outputted (ST38), and it is specified and checked where illicit copy data is sent from.

[0198] As mentioned above, the picture sensing device concerning an embodiment of the invention, Enabled it to input the signal which equips the comparison circuit 45 with the same composition as the device of a 2nd and 3rd embodiment, and serves as a comparison object from transmission lines, communication lines, etc., such as a network, and also. Since it asks the transmission control circuits 34 and 36 and subsequent data transmitting origin was investigated, transmit-end [besides the same effect as the device of a 2nd and 3rd embodiment] origin and a receiving agency can be specified, and detection of illicit copy data can be ensured further.

[0199] (A 5th embodiment of an invention) This embodiment is a modification of a 1st embodiment of an invention, and is related with an image processing terminal device.

[0200] Drawing 17 is a lineblock diagram showing an example of the image processing terminal device concerning a 5th embodiment of this invention, identical codes are given to drawing 1 and identical parts, explanation is omitted, and only a portion different here is described.

[0201] In this image processing terminal device, the data conversion circuit 50 is formed between the transport layer demultiplexer 2 and the decode circuit 4, Between the transport layer demultiplexer 2 - the data conversion circuit 50 is connected by the signal wire I20, and between the data conversion circuit 50 - the decode circuit 4 is connected by the signal wire I21.

[0202] The data for data conversion is inputted from the descrambler 3 via the signal wire I22 to the data conversion circuit 50.

[0203] The data conversion circuit 50 performs a kind of marking to final image data by performing data conversion to the MPEG-PS information outputted from the transport layer demultiplexer 2. Here, the information for performing data conversion is acquired from the descrambler 3.

[0204] The descrambler 3 generates the information for data conversion in the data conversion circuit 50, and sends it out to the data conversion circuit 50. Here, generation of the information for data conversion is performed using the signal wire I2 and the information inputted from I5.

[0205] Other composition is constituted like the image processing terminal device of a 1st embodiment. In the image processing terminal device constituted in this way, like the case of a 1st embodiment, marking

to image data is performed, and also data conversion is performed by the data conversion circuit 50, and a kind of marking to image data is performed by this.

[0206]As mentioned above, the picture sensing device concerning an embodiment of the invention, Since the same composition and operation as the device of a 1st embodiment were done so and also conversion was added to the data before decoding by the data conversion circuit 50, When image data besides the same effect as the device of a 1st embodiment is copied unjustly, the image processing terminal device copied much more certainly can be specified.

[0207](A 6th embodiment of an invention) Marking of the image processing terminal device explained in 1st and 2nd embodiments is carried out to the image data transmitted in CATV, satellite broadcasting, a VOD system, etc. by the display terminal side, and it aims at prevention from an illicit copy.

[0208]On the other hand, in this embodiment, the image processing device which performs marking to the original data supplied to transmitting [data] origin etc. is explained.

[0209]Drawing 18 is a lineblock diagram showing an example of the image processing device concerning a 6th embodiment of this invention.

[0210]This image processing device is constituted by the interface circuit 51, the image conversion circuit 52, the encode circuit 53, the interface circuit 54, and the circumference element that is not illustrated in addition to this.

[0211]The interface circuit 51 receives the input of the image data of an incompressible state.

[0212]The image conversion circuit 52 performs image transformation, i.e., marking which was explained by a 1st embodiment, to the image data inputted into the interface circuit. Therefore, the image conversion circuit 52 is provided with the following.

The same composition as the image conversion circuit 5 in drawing 1.

Composition which generates the information for image transformation which the descrambler 3 generates, and the same information.

[0213]The encode circuit 53 compresses the image data by which marking was carried out in the image conversion circuit 52 according to standards, such as MPEG 2, and outputs it to the interface circuit 54.

[0214]The interface circuit 54 carries out format conversion of the data compressed into the format which suits the data transmission line which this image processing device supplies eventually, a data storage medium, etc. in the encode circuit 53, and outputs it.

[0215]The marking means in a claim is constituted by the image conversion circuit 52, for example.

[0216]Next, the operation of an image processing device by which such composition was carried out is explained.

[0217]First, image processing device users, such as an owner of a copyright, determine the kind of image transformation according to some classification, such as an image data supply destination exception.

[0218]Next, original data, i.e., the original image data, is inputted into the interface circuit 51, the kind of image transformation for which it opted responds, and image transformation is made. The data compression of the changed picture is carried out, and it is outputted after still more nearly required format conversion.

[0219]Drawing 19 is a figure showing typically the image transformation at this time, and the situation of a data compression.

[0220]That is, it is put into "T company" (example (3) of a 1st embodiment of operation) by the original picture as a mark, and a data compression is further carried out to it.

[0221]When the data of an illicit copy is detected by changing such a conversion kind of image transformation, for example according to an image data supply destination, it can be judged whether which supply destination is supplied.

[0222]As mentioned above, the image processing device concerning an embodiment of the invention, Since the picture changed by the image conversion circuit 52 was compressed in the encode circuit 53, when the image data processed with this device is copied unjustly, By investigating the mark attached by image transformation, it can be specified whether which image data was copied.

[0223]By the way, as a device which detects the copy of the image data generated with this image processing device, the device shown by a 2nd, 3rd, and 4th embodiment and the same picture sensing device are used.

[0224]That is, attendant information, such as the data supply point about each image data, and the information on a mark kind which were generated with the described image processing unit by the device-identification-information generation part 26 in the picture sensing device shown in drawing 8 are saved, and it is made to output attendant information, such as an above data supply place about the detected image data.

[0225]This can be detected, when doing in this way and the image data generated from this picture sensing device is copied.

[0226]In each embodiment of above-mentioned this invention, by the case where image data, such as video, is treated, although explained, this invention is not restricted to this and can be applied also, for example to music data etc.

[0227]Here, when making an audio etc. into the final connection point, what is necessary is to replace with the image conversion circuit 6 shown in drawing 1, to replace with the video interface 6 using a voice conversion circuit, and just to consider it as an audio interface, and the operation in this case is the same as that of the case of video almost.

[0228]in the range which is not limited to each above-mentioned embodiment and does not deviate from the gist, many things are boiled and this invention can be changed

[0229]

[Effect of the Invention]Since the predetermined mark was given to image data according to this invention as a full account was given above, the image processing terminal device for preventing an illicit copy can be provided.

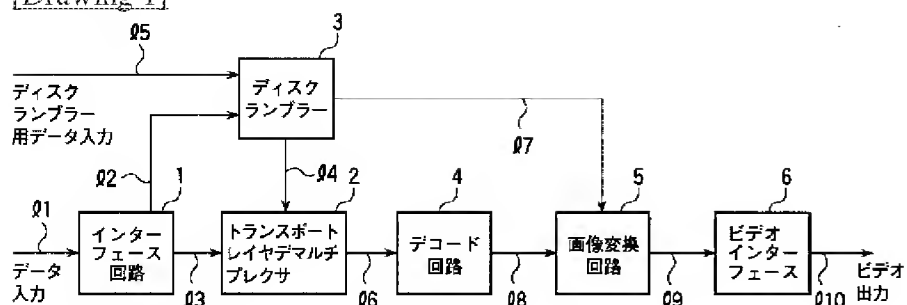
[0230]Since the predetermined mark was given to image data, the image processing device for preventing an illicit copy can be provided.

[0231]By investigating this predetermined mark, if an illicit copy should be carried out, the picture sensing device which detects this can be provided.

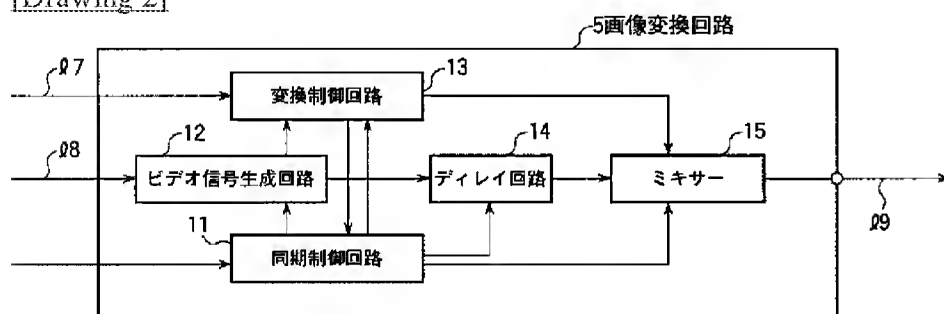
[Translation done.]

DRAWINGS

[Drawing 1]

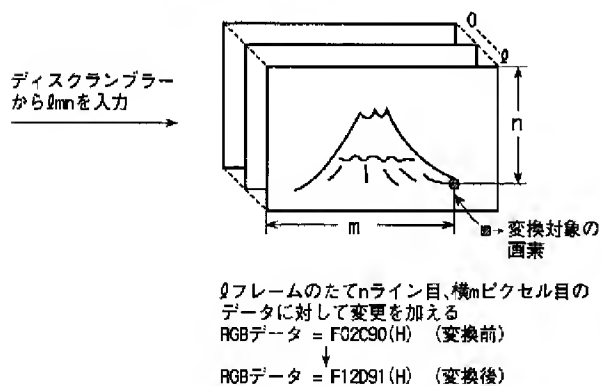


[Drawing 2]



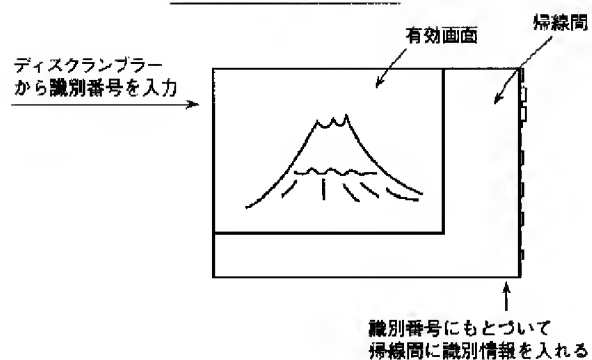
[Drawing 3]

画像変換回路 動作例(1)

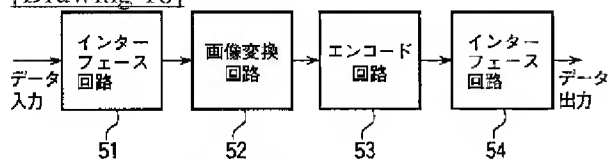


[Drawing 4]

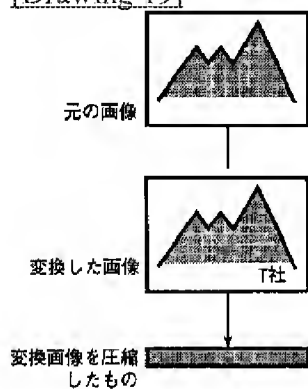
画像変換回路 動作例(2)



[Drawing 18]

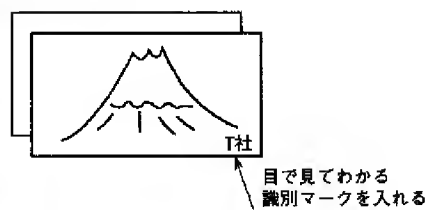


[Drawing 19]



[Drawing 5]

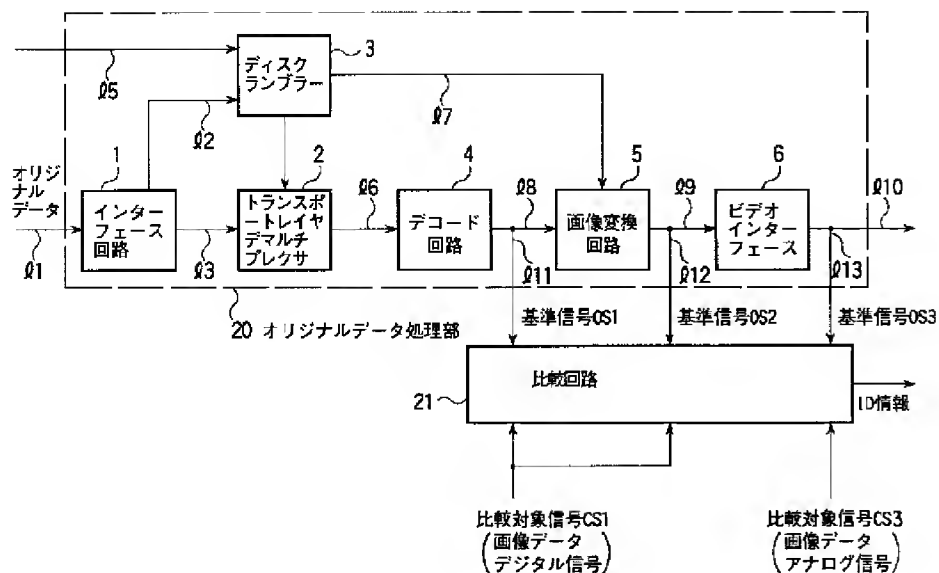
画像変換回路動作例(3)



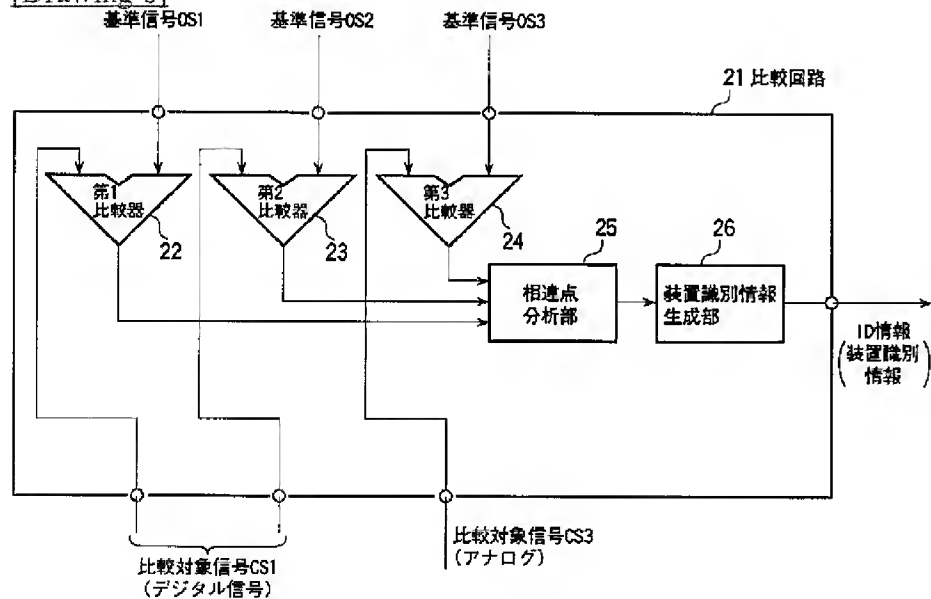
※ 捕捉 (識別マークの入れ方)

- (1) 始めと終りだけ入れる
- (2) 一定時間ごとに入れる
- (3) 場面の変わり目に入れる

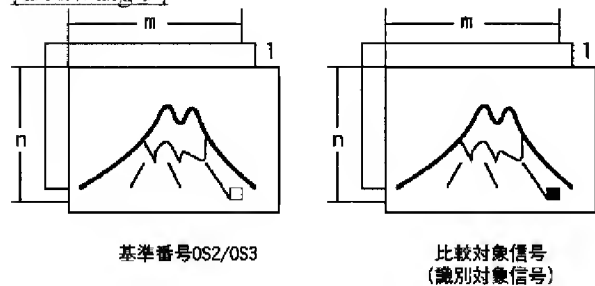
[Drawing 7]



[Drawing 8]

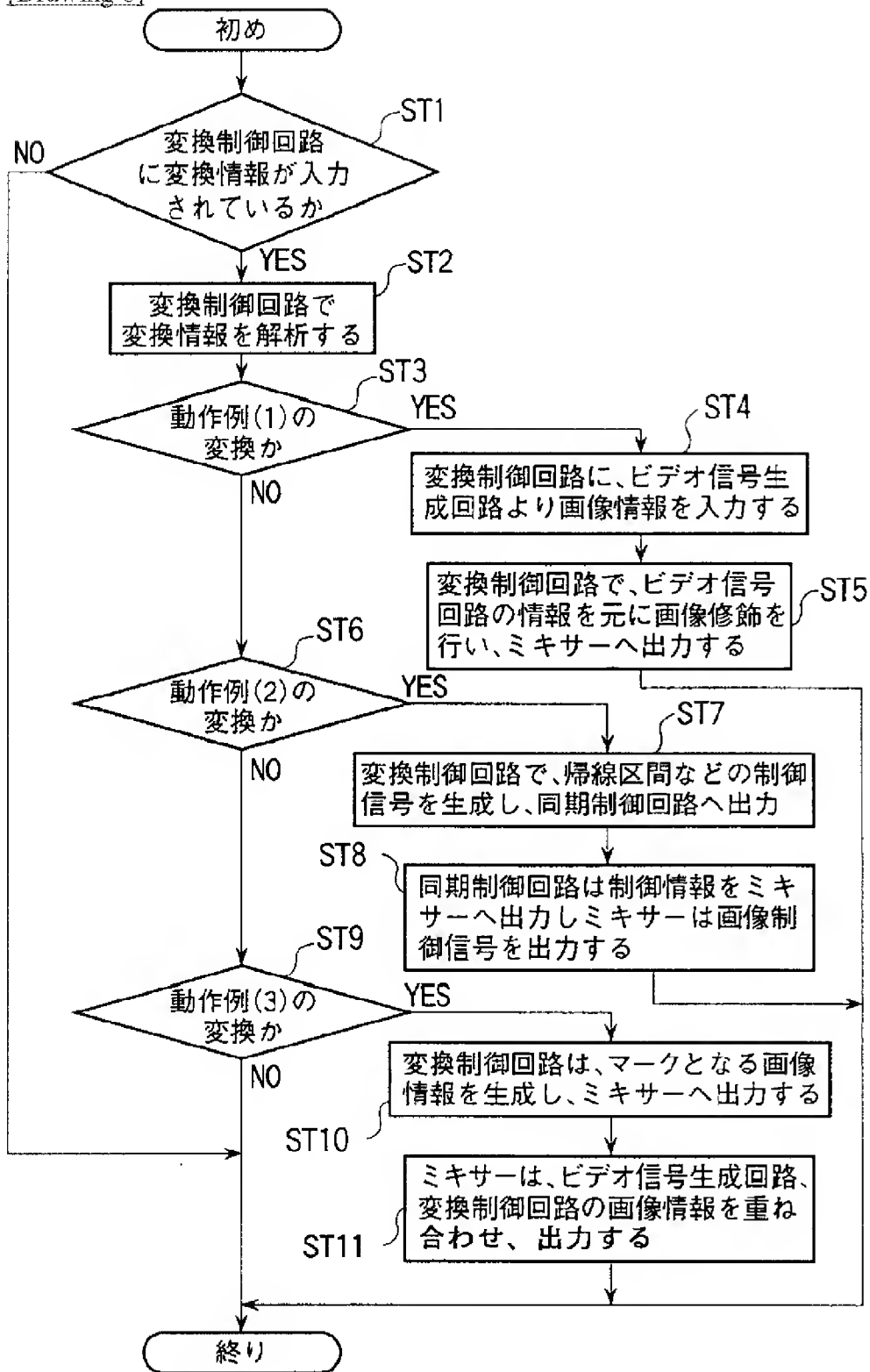


[Drawing 9]



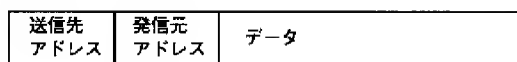
この二つの画像を比較することにより、1mmが得られ、装置を特定することができる

[Drawing 6]

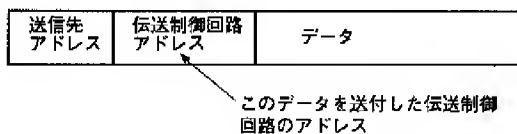


[Drawing 10]

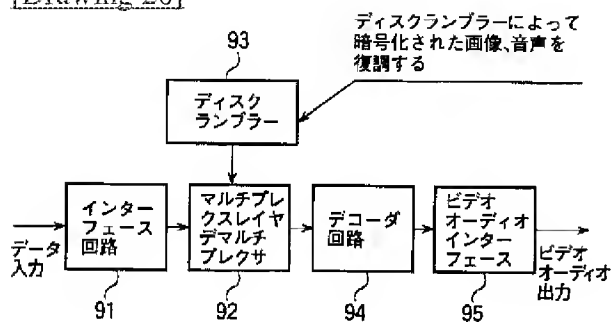
(a)



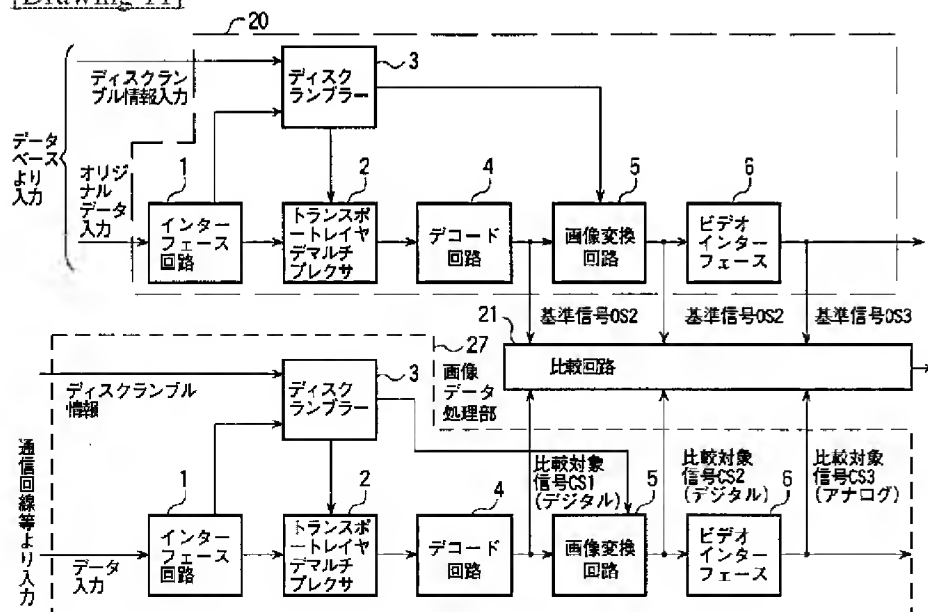
(b)



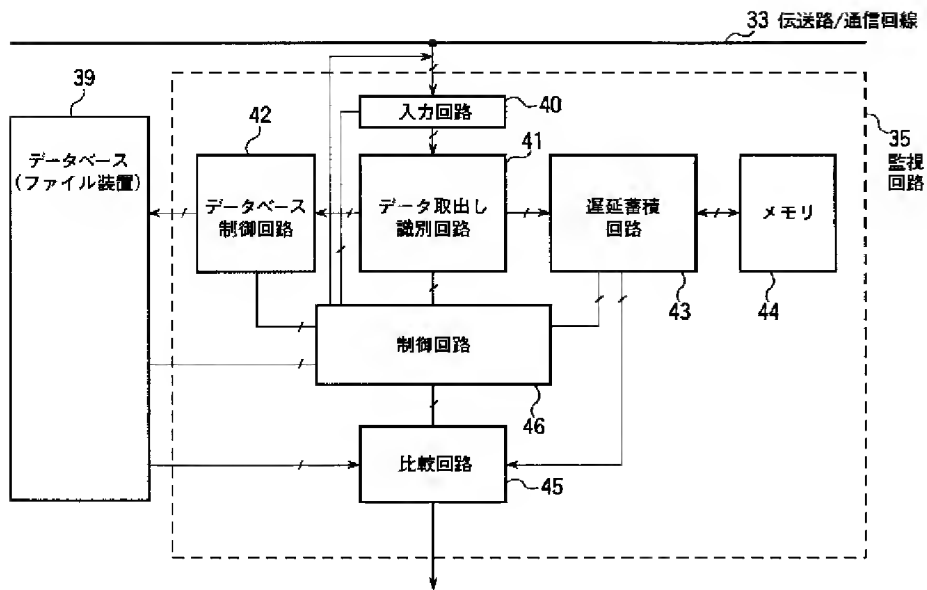
[Drawing 20]



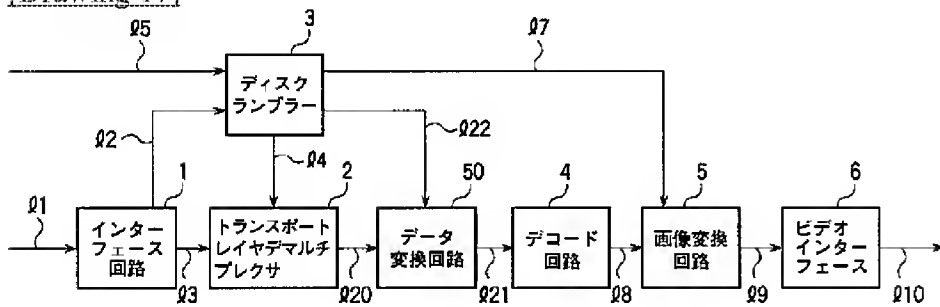
[Drawing 11]



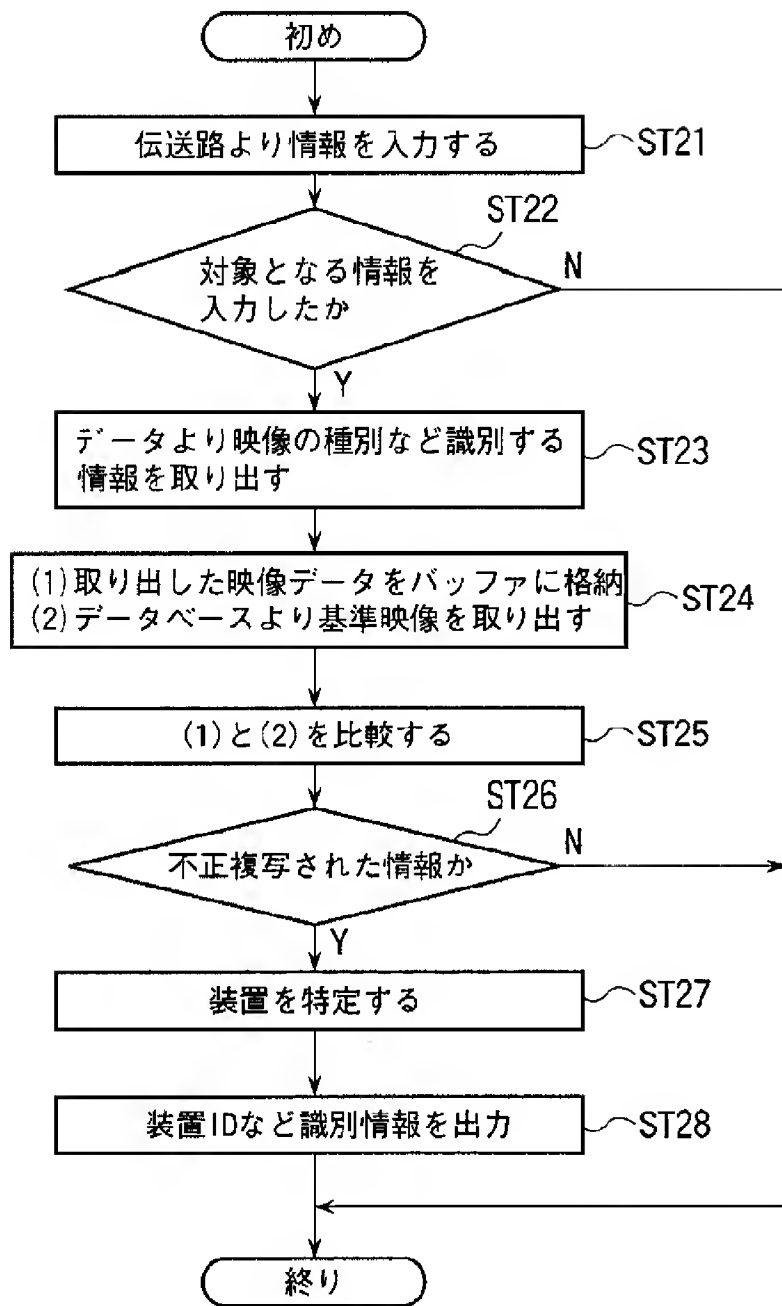
[Drawing 13]



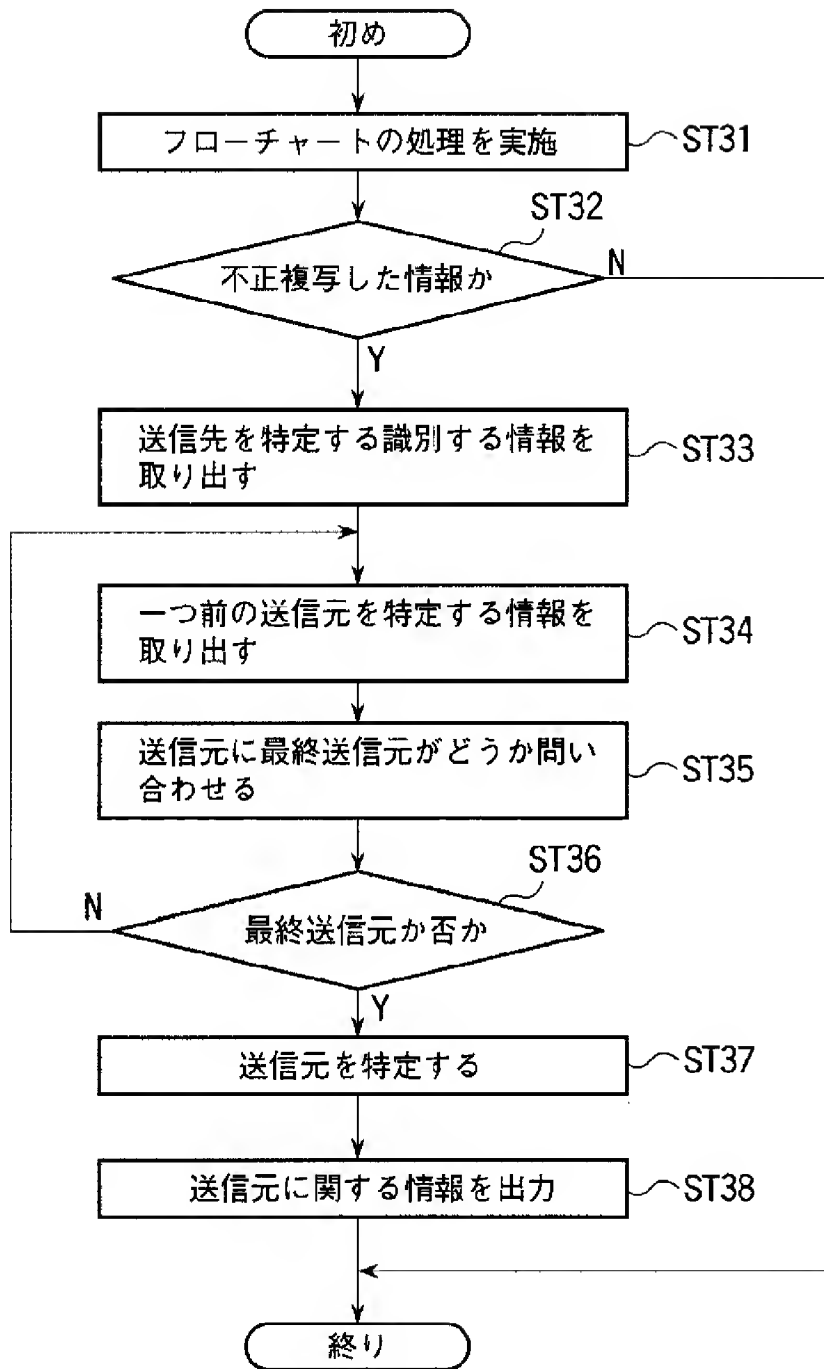
[Drawing 17]



[Drawing 14]



[Drawing 15]



[Translation done.]

CLAIMS

[Claim(s)]

[Claim 1] An image processing terminal device, wherein a source of image data is specified by having the following, and a mark in which marking was carried out by said marking means being detected, and a kind of the mark being judged.

A transmission format data conversion means which changes image data of compressed transmission format inputted from the exterior into a data format in which elongation processing is possible.

A decode means which performs elongation processing to image data changed into a data format in which said elongation processing is possible.

A marking means which outputs image data which carries out marking of the mark of a kind set up beforehand to this elongated image data, and by which the mark concerned was added to it.

[Claim 2] When encryption processing is performed to said transmission format image data, it has an encryption release means which inputs information for canceling encryption into said transmission format data conversion means, The image processing terminal device according to claim 1, wherein said transmission format data conversion means as which information for canceling said encryption was inputted also carries out code release when carrying out data conversion to a data format in which said elongation processing is possible.

[Claim 3] The image processing terminal device according to claim 1 or 2 carrying out marking of said mark into an effective display rectangle of a screen where said image data is displayed, and being able to view it.

[Claim 4] The image processing terminal device according to claim 1 or 2 carrying out marking of said mark into an effective display rectangle of a screen where said image data is displayed, and being unable to view it.

[Claim 5] The image processing terminal device according to claim 1 or 2, wherein marking of said mark is carried out out of an effective display rectangle of a screen where said image data is displayed.

[Claim 6] An image processing device, wherein a source of image data is specified by having the following, and a mark in which marking was carried out by said marking means being detected, and a kind of the mark being judged.

A marking means which carries out marking of the mark of a kind beforehand set as incompressible image data inputted from the exterior.

An encode means which carries out the data compression of the image data on which it was marked by this marking means, and outputs compressed image data.

[Claim 7] A picture sensing device comprising:

The 1st input means that inputs image data used as a standard.

The 2nd input means that inputs image data used as a comparison object.

A point-of-difference detection means to detect both point of difference when the contents of image data inputted by said 1st and 2nd input means are almost the same.

When there are two or more image processing terminal devices about at least one of image processing terminal devices of said claims 1 thru/or 5, Mark information holding mechanism by which information about a kind of mark set up for every image processing terminal device was held, A mark judging means which judges whether a portion of image data used as said comparison object in a point of difference detected by said point-of-difference detection means is a mark of which kind held at said mark

information holding mechanism, An equipment information output means which outputs equipment information of said image processing terminal device which carries out marking of the kind of mark when judged with it being said which kind of mark.

[Claim 8]A picture sensing device comprising:

The 1st input means that inputs image data used as a standard.

The 2nd input means that inputs image data used as a comparison object.

A point-of-difference detection means to detect both point of difference when the contents of image data inputted by said 1st and 2nd input means are almost the same.

Mark information holding mechanism by which information about a kind of mark about image data in which an image processing device of said claim 6 carried out marking was held, A mark judging means which judges whether a portion of image data used as said comparison object in a point of difference detected by said point-of-difference detection means is a mark of which kind held at said mark information holding mechanism, An information output means which outputs information about image data corresponding to the kind of mark when judged with it being said which kind of mark.

[Claim 9]The picture sensing device according to claim 7 or 8, wherein image data used as said comparison object is inputted from a communication path or a transmission route of image data.

[Translation done.]